



MATERIAL SAFETY DATA SHEET

PRODUCT

NALCO 352 CORROSION INHIBITOR

Emergency Telephone Number

Medical (708) 920-1510 (24 hours)

SECTION 1 PRODUCT IDENTIFICATION

TRADE NAME: NALCO 352 CORROSION INHIBITOR

DESCRIPTION: An aqueous solution of amine

NFPA 704M/HMIS RATING: 3/3 HEALTH 1/1 FLAMMABILITY 0/0 REACTIVITY 0 OTHER
0=Insignificant 1=Slight 2=Moderate 3=High 4=Extreme

SECTION 2 HAZARDOUS INGREDIENTS

Our hazard evaluation has identified the following chemical ingredient(s) as hazardous under OSHA's Hazard Communication Rule, 29 CFR 1910.1200. Consult Section 14 for the nature of the hazard(s).

| INGREDIENT(S) | CAS # | APPROX. % |
|---------------|----------|-----------|
| Morpholine | 110-91-8 | 40-70 |

SECTION 3 PRECAUTIONARY LABEL INFORMATION

WARNING: Causes eye injury and skin irritation. May be harmful if inhaled, ingested or absorbed through the skin. Do not get in eyes. Avoid contact with skin and clothing. Wear goggles and face shield when handling. Avoid prolonged or repeated breathing of vapor. Use with adequate ventilation. Do not take internally. Keep away from heat and open flame. Keep container closed when not in use.

Empty containers may contain residual product. Do not reuse container unless properly reconditioned.

SECTION 4 FIRST AID INFORMATION

EYES: Immediately flush for at least 15 minutes while holding eyelids open. Call a physician at once.

SKIN: Immediately flush with water for at least 15 minutes. For a large splash, flood body under a shower. Call a physician at once.

INGESTION: Do not induce vomiting. Give water. Call a physician at once.

INHALATION: Remove to fresh air. Treat symptoms. Call a physician.

NOTE TO PHYSICIAN: Based on the individual reactions of the patient, the physician's judgment should be used to control symptoms and clinical condition.

CAUTION: If unconscious, having trouble breathing or in convulsions, do not induce vomiting or give water.



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SECTION 4 FIRST AID INFORMATION

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NOTE TO PHYSICIAN: Probable mucosal damage may contraindicate the use of gastric lavage. Measures against circulatory shock, respiratory depression and convulsions may be needed.

SECTION 5 HEALTH EFFECTS INFORMATION

PRIMARY ROUTE(S) OF EXPOSURE: Eye, Skin, Inhalation

EYE CONTACT: Can cause injury or damage.
SKIN CONTACT: Can cause severe irritation.
INGESTION: Can cause kidney damage. Can be harmful.
INHALATION: Can be corrosive to the mucous membranes and the lungs.

SYMPTOMS OF EXPOSURE: Morpholine has been shown to cause kidney damage in experimental animals.

AGGRAVATION OF EXISTING CONDITIONS: A review of available data does not identify any worsening of existing conditions.

SECTION 6 TOXICOLOGY INFORMATION

ACUTE TOXICITY STUDIES: Acute toxicity studies have been conducted on this product along with acute toxicity studies on the hazardous ingredient(s) in Section 2. The results are shown below.

ACUTE ORAL TOXICITY (ALBINO RATS): $LD_{50} = 3,053$ mg/kg

95% Confidence Limit = 2,174 - 4,285 mg/kg

COMMENTS: Examination of test animals after death showed intestinal bleeding and chemical burns of the stomach lining. Results were from the tested product.

ACUTE DERMAL TOXICITY (ALBINO RABBITS): $LD_{50} =$ Greater than 3,083 mg/kg

PRIMARY SKIN IRRITATION TEST (ALBINO RABBITS):

SKIN IRRITATION INDEX DRAIZE RATING: 5.0/8.0 Moderately irritating

COMMENTS: Second degree chemical burns were noted within 72-hours after treatment to the abraded skin of the test animals. The intact sites showed moderate irritation which improved after 72-hours.

PRIMARY EYE IRRITATION TEST (ALBINO RABBITS):



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SECTION 6 TOXICOLOGY INFORMATION

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EYE IRRITATION INDEX DRAIZE RATING: 43.7/110.0 Severely irritating

COMMENTS: Corneal damage and corrosion was noted within one hour after treatment. Iridial scores were maximum within one hour after treatment and burns to the conjunctiva were noted.

OTHER TOXICITY RESULTS: Mutagenicity testing results on morpholine are: Ames test negative; sister chromatid exchange equivocal; cell transformation positive; mouse lymphoma weakly positive; rat hepatocyte/DNA repair negative.

Acute Inhalation Toxicity (Albino Rats):
Morpholine LC₅₀ = Greater than 12,000 ppm

CHRONIC TOXICITY RESULTS: A two year rat inhalation study with morpholine was negative.

SECTION 7 PHYSICAL AND CHEMICAL PROPERTIES

COLOR: Clear colorless to light yellow

FORM: Liquid ODOR: Slight ammonia

DENSITY: 8.5 - 8.7 lbs/gal.

SOLUBILITY IN WATER: Completely

SPECIFIC GRAVITY: 1.02-1.04 @ 77 Degrees F ASTM D-1298

pH (NEAT) = 10.5 pH (at 1%) 9.1 ASTM E-70

VISCOSITY: 5.5 cps @ 77 Degrees F ASTM D-2983

FREEZE POINT: -8 Degrees F ASTM D-1177

FLASH POINT: Greater than 200 Degrees F (PMCC) ASTM D-93

PERCENT VOLATILE

BY WEIGHT: 40 @ 75 Degrees F

NOTE: These physical properties are typical values for this product.

SECTION 8 FIRE AND EXPLOSION INFORMATION

FLASH POINT: Greater than 200 Degrees F (PMCC) ASTM D-93

EXTINGUISHING MEDIA: This product would not be expected to burn unless all the water is boiled away. The remaining organics may be ignitable. Use water to cool containers exposed to fire.

UNUSUAL FIRE AND EXPLOSION HAZARD: May evolve NOx under fire conditions.



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SECTION 9 REACTIVITY INFORMATION

INCOMPATIBILITY: N-nitrosamines, many are cancer causing agents to laboratory animals, may be formed when certain amines are mixed with nitrous acid, organic or inorganic nitrites or atmospheres with high nitrous oxide concentrations.

Aluminum, brass, nickel, copper and its alloys.

Avoid contact with strong oxidizers (eg. chlorine, peroxides, chromates, nitric acid, perchlorates, concentrated oxygen, permanganates) which can generate heat, fires, explosions and the release of toxic fumes.

Avoid contact with strong acids (eg. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) which can generate heat, splattering or boiling and the release of toxic fumes.

THERMAL DECOMPOSITION PRODUCTS: In the event of combustion CO, CO₂, NO_x may be formed. Do not breathe smoke or fumes. Wear suitable protective equipment.

SECTION 10 PERSONAL PROTECTION EQUIPMENT

RESPIRATORY PROTECTION: If it is possible to generate significant levels of vapors or mists, a NIOSH approved or equivalent half-face mask with a green cartridge respirator is recommended.

For large spills, entry into large tanks, vessels or enclosed small spaces with inadequate ventilation, a pressure-demand, self-contained breathing apparatus is recommended.

VENTILATION: General ventilation is recommended. Additionally, local exhaust ventilation is recommended where vapors, mists or aerosols may be released.

PROTECTIVE EQUIPMENT: Wear impermeable gloves, boots, apron and a face shield with chemical splash goggles. Examples of impermeable gloves available on the market are neoprene, nitrile, PVC, natural rubber, viton and butyl (compatibility studies have not been performed). A full slicker suit is recommended if gross exposure is possible.

The availability of an eye wash fountain and safety shower is recommended.

If clothing is contaminated, remove clothing and thoroughly wash the affected area. Launder contaminated clothing before reuse.



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SECTION 11 SPILL AND DISPOSAL INFORMATION

IN CASE OF TRANSPORTATION ACCIDENTS, CALL THE FOLLOWING 24-HOUR TELEPHONE NUMBER (708-920-1510)

SPILL CONTROL AND RECOVERY:

Small liquid spills: Contain with absorbent material, such as clay, soil or any commercially available absorbent. Shovel reclaimed liquid and absorbent into recovery or salvage drums for disposal. Refer to CERCLA in Section 14.

Large liquid spills: Dike to prevent further movement and reclaim into recovery or salvage drums or tank truck for disposal. Refer to CERCLA in Section 14.

DISPOSAL: If this product becomes a waste, it does not meet the criteria of a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D.

As a non-hazardous liquid waste, it should be solidified with stabilizing agents (such as sand, fly ash, or cement) so that no free liquid remains before disposal to an industrial waste landfill. A non-hazardous liquid waste can also be incinerated in accordance with local, state, and federal regulations.

SECTION 12 ENVIRONMENTAL INFORMATION

If released into the environment, see CERCLA in Section 14.

SECTION 13 TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME/HAZARD CODE - PRODUCT IS NOT REGULATED DURING TRANSPORTATION

SECTION 14 REGULATORY INFORMATION

The following regulations apply to this product.

FEDERAL REGULATIONS:

OSHA'S HAZARD COMMUNICATION RULE, 29 CFR 1910.1200:

Based on our hazard evaluation, the following ingredient in this product is hazardous and the reason is shown below.

Morpholine - Corrosive to eyes/skin



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SECTION 14 REGULATORY INFORMATION

(CONTINUED)

Morpholine = TWA 20 ppm, 71 mg/m³ (skin) ACGIH/TLV

Morpholine = TWA 20 ppm, STEL 30 ppm (skin) OSHA/PEL
70 mg/m³ 105 mg/m³ OSHA/PEL

CERCLA, 40 CFR 117, 302:

Notification of spills of this product is not required.

SARA/SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986
(TITLE III) - SECTIONS 302, 311, 312 AND 313:

SECTION 302 - EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355):

This product does not contain ingredients listed in Appendix A and B as an Extremely Hazardous Substance.

SECTIONS 311 and 312 - MATERIAL SAFETY DATA SHEET REQUIREMENTS (40 CFR 370):
Our hazard evaluation has found this product to be hazardous. The product should be reported under the following EPA hazard categories:

- XX Immediate (acute) health hazard
- Delayed (chronic) health hazard
- Fire hazard
- Sudden release of pressure hazard
- Reactive hazard

SECTION 313 - LIST OF TOXIC CHEMICALS (40 CFR 372):

This product does not contain ingredients on the List of Toxic Chemicals.

TOXIC SUBSTANCES CONTROL ACT (TSCA):

The chemical ingredients in this product are on the 8(b) Inventory List (40 CFR 710).

FOOD AND DRUG ADMINISTRATION (FDA):

Federal Food, Drug and Cosmetic Act:

When use situations necessitate compliance with FDA regulations, this product is acceptable under 21 CFR 173.310 Boiler Water Additives. The following use limitations apply: Maximum dosage not to exceed 25 ppm in the steam. May not be used where the steam contacts milk or milk products.

U. S. DEPARTMENT OF AGRICULTURE (USDA):

USDA Inspection and Grading Programs - Food Safety and Inspection Service:
This product is authorized by USDA for use in federally inspected meat and poultry plants. Authorized use is under category G6.



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SECTION 14 REGULATORY INFORMATION

(CONTINUED)

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA), 40 CFR 261 SUBPART C & D:
Consult Section 11 for RCRA classification.

FEDERAL WATER POLLUTION CONTROL ACT, CLEAN WATER ACT, 40 CFR 401.15
(formerly Sec. 307), 40 CFR 116 (formerly Sec. 311):
None of the ingredients are specifically listed.

CLEAN AIR ACT, 40 CFR 60, SECTION 111, 40 CFR 61, SECTION 112:
This product contains the following ingredients covered by the Clean Air Act:

Morpholine - Section 111

STATE REGULATIONS:

CALIFORNIA PROPOSITION 65:
This product does not contain any chemicals which require warning under
California Proposition 65.

MICHIGAN CRITICAL MATERIALS:
This product does not contain ingredients listed on the Michigan Critical
Materials Register.

STATE RIGHT TO KNOW LAWS:

The following ingredients shown are disclosed for compliance with State Right
To Know Laws:

| | |
|------------|-----------|
| Morpholine | 110-91-8 |
| Water | 7732-18-5 |

SECTION 15 ADDITIONAL INFORMATION

None

SECTION 16 USER'S RESPONSIBILITY

This product material safety data sheet provides health and safety
information. The product is to be used in applications consistent with
our product literature. Individuals handling this product should be
informed of the recommended safety precautions and should have access
to this information. For any other uses, exposures should be evaluated
so that appropriate handling practices and training programs can be
established to ensure safe workplace operations. Please consult your
local sales representative for any further information.



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SECTION 17 BIBLIOGRAPHY

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